

measuring a transmittance of said optical system at said set time interval for measurement;

setting an exposure amount control target value in accordance with said measured transmittance of said optical system; and

transferring said pattern onto said substrate through said optical system, while an exposure amount is controlled based on photodetection results of a part of said exposure light and said set exposure amount control target value.

Subj C3

6. (Twice Amended) An exposure method performed by an exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said method comprising:

photodetecting a part of said exposure light in an optical path of said exposure light; setting a time interval for measurement of a transmittance of said optical system which is arranged between a position of photodetecting a part of said exposure light and said substrate in accordance with a variation amount of a transmittance of said optical system;

setting an exposure amount control target value in accordance with said measured transmittance of said optical system at said set time interval for measurement; and

transferring said pattern onto said substrate through said optical system, while an exposure amount is controlled based on photodetection results of a part of said exposure light and said set exposure amount control target value.

Subj C4

14. (Twice Amended) An exposure method to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:

setting a time interval for measurement in accordance with each of at least two exposure conditions; and

Sub C1
Sub C2
Sub C3
Sub C4

measuring a variation in the amount of said exposure light which passes through said optical system and reaches onto said substrate at said set time interval for measurement.

15. (Amended) An exposure method according to Claim 14, wherein said two exposure conditions include at least one of an illumination condition to illuminate a mask, a transmittance of said mask, a minimum line width, and a permissible exposure amount error.

Sub C5

16. (Amended) An exposure method to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:
measuring a variation in the amount of said exposure light passing through said optical system in a predetermined time interval for measurement; and
changing said predetermined time interval for measurement upon said measuring, in accordance with a comparison result of a variation of a first measurement of said light amount and a variation of a second measurement of said light amount.

22. (Twice Amended) An exposure method to transfer a pattern illuminated with exposure light from a light source through an optical system onto a substrate, said method comprising:

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setting a time interval for measurement in accordance with each of at least two exposure conditions; and
measuring an amount of said exposure light which passes through said optical system and reaches onto the said substrate at said time interval for measurement.

Sub C7

24. (Twice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:
a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;
an optical system arranged between said branch optical system and said substrate;

a transmittance measurement unit to measure a transmittance of said optical system; a control unit connected with said transmittance measurement unit to set a time interval for measurement of said transmittance measurement unit in accordance with an exposure condition;

an exposure amount setting unit connected with said transmittance measurement unit to set an exposure amount control target value in accordance with said measured transmittance of said optical system; and

an exposure amount control system connected with said exposure amount setting unit to control an exposure amount based on said set exposure amount control target value;

wherein said transmittance measurement unit measures a transmittance of said optical system at said set time interval for measurement.

28. (Twice Amended) An exposure apparatus according to Claim 24, further comprising:

an information reading unit to read information of a mask on which the pattern is formed, and

said control unit automatically determines time intervals for measurement of said transmittance measurement unit based on said information of said mask read by said information reading unit.

29. (Twice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;
a transmittance measurement unit to measure a transmittance of said optical system;

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a control unit connected with said transmittance measurement unit to set a time interval for transmittance measurement of said transmittance measurement unit in accordance with a variation amount between a transmittance obtained by a most recent transmittance measurement and a transmittance obtained by a measurement performed before said most recent measurement, said respective measurement-performed by said transmittance measurement unit;

an exposure amount setting unit connected with said transmittance measurement unit to set an exposure amount control target value in accordance with said measured transmittance of said optical system; and

an exposure amount control system connected with said exposure amount setting unit to control an exposure amount based on said set exposure amount control target value;

wherein

 said transmittance measurement unit measures a transmittance of said optical system at said set time interval for transmittance measurement.

34. (Twice Amended) An exposure apparatus according to Claim 24, wherein said control unit sets a time interval for measurement of said transmittance measurement unit in accordance with a transmittance of said mask on which said pattern is formed.

35. (Twice Amended) An exposure apparatus according to Claim 24, wherein said control unit sets a time interval for measurement of said transmittance measurement unit in accordance with one of a minimum line width and a permissible exposure amount error.

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42. (Twice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

 a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;
a first sensor arranged in the optical path of a part of said branched exposure light to photodetect a part of said exposure light;
a second sensor arranged substantially flush with said substrate to photodetect said exposure light passing through said optical system;
a measurement unit connected with said first sensor and said second sensor to measure a variation in an amount of exposure light passing through said optical system, based on an output signal from said first sensor and output signal from said second sensor;
and
a control unit connected with said measurement unit to change a time interval of a measurement performed by said measurement unit in accordance with change in an exposure condition.

44. (Twice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:
a measurement unit to measure a variation in an amount of exposure light passing through said optical system; and
a control unit connected with said measurement unit to change a time interval of a measurement performed by said measurement unit, in accordance with a comparison result of a variation of a first measurement of said light amount and a variation of a second measurement of said light amount.

46. (Twice Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:

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a measurement unit to measure an amount of exposure light passing through said optical system and reaching onto said substrate at a predetermined time interval; and a control unit connected with said measurement unit to set said time interval of a measurement performed by said measurement unit in accordance with an exposure condition.

66. (Amended) An exposure method according to Claim 19, further comprising:
measuring a transmittance of said optical system at a predetermined time interval, and
correcting said transmittance time-varying prediction function each time a transmittance measurement is performed.

67. (Amended) An exposure method according to Claim 66, wherein said predetermined time interval of said measuring said transmittance is determined in respect to a relationship with a required exposure precision.

68. (Amended) An exposure method according to Claim 66, wherein said time interval of said measuring said transmittance is
short when a rate of change in said transmittance of said optical system is large, and
long when said rate of change in said transmittance of said optical system is small.
